

Hideaki OHBA*: On the genus *Sedum* in Burma

大場秀章*: ビルマ産のベンケイソウ属について**

Owing to topographical and political difficulties our knowledge of Burmese flora is still insufficient. Based on the material obtained by explorations from the frontier between Yunnan and Burma by Forrest, Farrer and Kingdon-Ward, a number of species of *Sedum* were newly described and were reported to occur in Burma (Praeger 1921, R.-Hamet 1929, Fröderström 1930, 31 & 42). While studying the Himalayan species, I examined also the Burmese species of *Sedum*. As the result I recognized 10 species of *Sedum* from the region as enumerated in the present paper. The distribution types of these species may be distinguished as follows:

(a) Species extending from Kashmir eastward through Kumaon, Nepal, Sikkim, Bhutan, Assam, Burma to Yunnan: *S. multicaule*.

(b) East Himalayan species extending to Burma and Yunnan: *S. ovatisepalum* and *S. bupleuroides*. *S. ovatisepalum* is the only representative of the Himalayan species extending disjunctively southward to Mt. Victoria in W. Burma (21°10'N). *S. bupleuroides* extends from Nepal through Sikkim, Bhutan, moist river-gorge country of S.E. Tibet (Chumbi Valley), and N.W. Burma to Yunnan.

(c) Species confined in Burma, Yunnan, and Szechuan: *S. Kingdonii* (endemic in Burma), *S. macrocarpum*, *S. nobile*, *S. venustum* (extending to E. Tibet), and *S. yunnanense*. It can be expected that further species of *Sedum* showing this pattern of distribution may be found in the alpine region of Northern Upper Burma.

(d) Species extending from Burma and Yunnan to middle China (Kansu, Shensi, etc.): *S. amplibracteatum* and *S. filipes*.

Nath (1961) recorded *Crassula nemorosa* Endl. from Yawng'hwe in the Southern Shan State as native, and he wrote: "Succulent herb propagating by leaf buds, flowers in terminal panicles, red in colour". *C. nemorosa* is,

* Department of Botany, University Museum, University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113. 東京大学総合研究資料館植物部門

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however, restricted in S.W. Cape Province, S. Africa and has white flowers. Therefore the determination is dubious and the plant may possibly be *S. indicum* (Decaisne) R.-Hamet.

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1. ***Sedum* [Sedum § *Triactina*] *amplibracteatum*** K.T. Fu in Fl. Tsinling. 1: 425 (1974).

S. bracteatum Diels in Engl., Bot. Jahrb. 29: 362 (1900), non Viviani (1824)—Praeger in Not. Bot. Gard. Edinb. 13: 74 (1921)—Fröd. in Act. Hort. Gothob. 6: append. 100 (1931).

Praeger (1921) cited two specimens from Burma: Upper Burma, Hpimaw Pass, alt. 10000 ft., on shady banks in forest (Kingdon-Ward 1878, E, non vidi) and loc. cit., alt. 10500 ft., damp cool moss banks (Farrer 1026, E, non vidi).

Distr. Upper Burma, Yunnan, Szechuan, Hunan, Kansu, Shensi, and Honan.

2. ***Sedum* [Rhodiola § *Rhodiola*] *bupleuroides*** Wall. [Cat. no. 7229 (1832), nom. nud.] ex Hook. f. et Thoms. in Journ. Linn. Soc. Bot. 2: 98 (1858)—H. Ohba in Ohashi, Fl. E. Himal. 3rd report, 320 (1975).

Examined specimen from Burma: N.W. Burma, 26°24'N, 98°48'E, alt. 13000 ft., on humus covered boulders and ledges of cliffs (Forrest 27114, K).

Distr. Nepal, Sikkim, Bhutan, Tibet, Burma, and Yunnan.

3. ***Sedum* [Sedum § *Filipes*] *filipes*** Hemsley apud Forbes et Hemsley in Journ. Linn. Soc. Bot. 23: 284, t. 7a f. 1-3 (1887)—Praeger in Not. Bot. Gard. Edinb. 13: 82 (1921)—R.-Hamet in Candollea 4: 31 (1929), ut var. *genuinum* R.-Hamet—Berger in Engl. et Prantl, Pflanzenfam. 2 Aufl. 18a: 450 (1930).

S. tridentaloides Praeger in Not. Bot. Gard. Edinb. 13: 95 (1921).

S. elatinoides Franch. sensu Fröd. in Act. Hort. Gothob. 6: append. 36 (1931), pro parte.

The type of *S. tridentaloides* Praeger was collected in Burma, i.e. Upper Burma, Hpimaw limestone peak, alt. 9000-10000 ft., on wet moss-covered boulders in shade (Kingdon-Ward 1770, E, non vidi). Moreover, Praeger cited another specimen as *S. filipes* Hemsley. This specimen was mentioned collected in Upper Burma, Kang-fang, E. flank of Imaw-Bum Range, 28°20'N,

98°30'E, alt. 6000 ft., growing in beds of moss in a very dark situation beneath a big boulder in the forest (Kingdon-Ward 3690, E, non vidi).

Distr. Nepal, Sikkim, Burma, Yunnan, Szechuan, Hupeh, Shensi, and Kiangsu.

4. **Sedum [Sedum § Oreades] Kingdonii¹⁾** H. Ohba, sp. nov.

Ex affinitate *Sedi Pampaninii* R.-Hamet et *S. Daigremontiani* R.-Hamet, a *Sedo Pampaninii* foliis 8-14(non 4-7) mm longis, calcari eorum semper trilobulato (nec integro), pedicello valde breviori, gynoecis 4.5-5.2(nec 5-8) mm longis et ipsis circiter 1(nec 2-3) mm connatis, et a *S. Daigremontiano* foliis paene integris (non subimbricatis), petalis distinctis anguste ovatis et margine integris (nec angustissime triangularibus satis connatis nec erosio) et glandulis oblongis (nec linearibus) valde distinctum.

Herba perennis parva plerumque 5-7 cm alta. Caules graciles haudo subterranei, glabri et laeves, 5-10 cm longi 1.0-1.2 mm lati, praeter basin fere erecti; basi repentes ad nodos radicantes, raro semel ramificantes, in floriferis caulinibus foliis bienniculis mortuisque semper vestiti, sed in sterilibus sine eis vetusti; parte superiore in floriferis pauci (1-4)-ramosi. Folia alterna, dense disposita, in media parte caulis non nimis majora, adscendentia (e caule sub angulo circa 40°-45° prodeuntia), sessilia, subulata vel anguste ovata, apice acuta basi vero calcarata, in sicco herbacea sed in vivo plus minusve (?) crassiuscula, utrinque complanata, glabra et laevia (sub lente nunquam papillata), margine fere integra, (calcari excepto) 8-14 mm longa 1.2-2.0 mm lata, ad basin latissima; calcari certo minute trilobulato, mediano lobulo calcaris semper maximo, trianguli-triangulo- vel depresso ovato apice obtuso vel truncato, basi 0.7-1.5 mm lato, laterali minimo, apice obtuso basi 0.2-0.5(-0.7) mm lato; venis subparallelibus invisibilibus, marginem non attingentibus. Inflorescentia scilicet cymosa terminalis, floribus (8-)10-16(-40) ornata; pedunculo 2-4 mm longo teretiusculi paene laevi; bractea fere foliis caulis simili; pedicello 0.5-2.5 mm longo laevi. Flores hermaphroditi, in sicco 0.9-1.2 cm diametro, plerumque quinque-partiti. Sepala viridia, fere aequi- vel paululum inaequimagna, 3.5-5.2 mm longa 0.8-1.2 mm lata, petalis paulo breviora, in vivo verisimiliter crassiuscula, distincta sed ad basin leviter (longitudine circiter 0.3 mm) connata, vulgo

1) Nomen hoc dedi in honorem collectoris F. Kingdon-Ward.

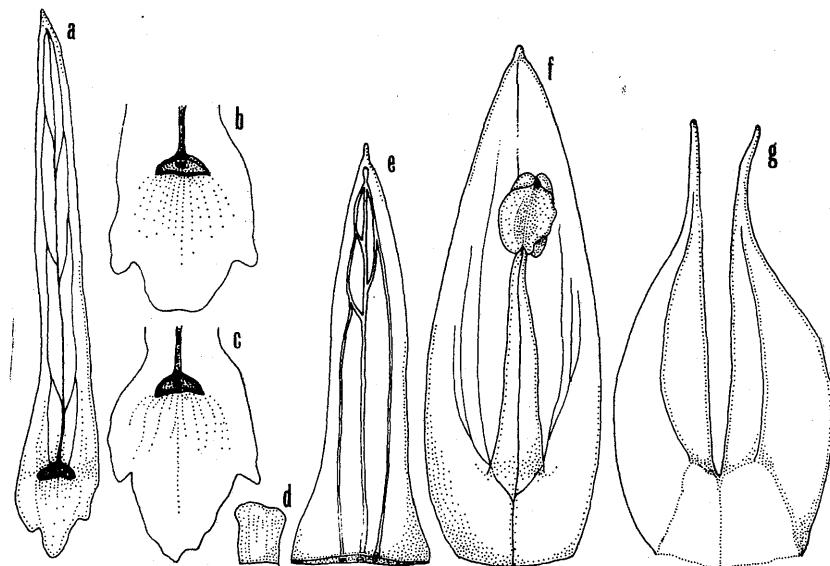


Fig. 1. *Sedum Kingdonii*. a. Leaf. $\times 6$. b & c. Leaf spur. $\times 12$. d. Gland. $\times 12$.
e. Sepal. $\times 12$. f. Petal with a stamen. $\times 12$. g. Ovary. $\times 12$.

lineari-lanceolata sed raro proxime linearia aut lineari-oblanceolata, apice acuta basi semper ecalcarata, margine paene integra, utrinque complanata glabra et laevia, sub anthesi aliquantum patentia, venatione triplinervia, venis invisibilibus, marginem non attingentibus. Petala quinque distincta sessilia tenuia glabra ecarinato-cymbiformia, anguste ovata apice brevissime mucronulato-obtusa, margine vere integra, 5.1-7.2 mm longa 1.8-2.2 mm lata, sub anthesi satis patentia, lutea. Stamina numero (8-)10, petalis gynoeciosisque semper breviora; filamentis angustissime triangularibus, pauxillum obcompressis glabris, basi 0.6-0.7 mm latis, sub anthesi adscendentibus, epipetalis circa 1 mm supra basin orientibus, 2.5-3 mm longis, alternipetalis 3-3.5 mm longis; antheris basifixis prope globosis apice rotundatis vel leviter retusis, 0.6-0.7 mm longis 0.4-0.5 mm latis, ut videtur et ante anthesin et effuso polline saturate luteis. Glandulae complanatae oblongae 0.6-0.7 mm longae 0.4-0.5 mm latae, margine integrae apice rotundatae, in sicco ferruginea. Gynoecia quinque, 4.5-5.2 mm longa, basi leviter (longitudine circa 1 mm) connata; ovario suburceolato sessili erecto, latere ventrali sine gibbositate, 3.5-4.1 mm longo 1.0-1.2 mm lato, stylo circa 1 mm longo, stricto

vel plus minusve obliquo inconspicue attenuato, apice in stigma sat obscurum epapillatum desinente; placenta valde intramarginali, funiculo 0.2–0.3 mm longo. Ovula in quoque loculo numero 16–20, biseriato, anatropa, circa 0.5–0.6 mm longa, ellipsoidea, apice rotundata.

Burma. Mt. Victoria, alt. 9000–10000 ft. Prostrate, on rocks and on stony slopes in the open. Flowers yellow (F. Kingdon-Ward 22787, GB—Holotype).

5. *Sedum* [*Rhodiola* § *Rhodiola*] ***macrocarpum*** Praeger in Not. Bot. Gard. Edinb. 13: 88 (1921)—Berger in Engl. et Prantl, Pflanzenfam. 2 Aufl. 18a: 440 (1930).

S. Kirilowii Regel et Tiling sensu Fröd. in Act. Hort. Gothob. 5: append. 40 (1930), pro parte.

S. Aizoon L. form. *angustifolia* Franch. sensu Fröd. in Ark. Bot. 30A(9): 7 (1943), versim.

This species was described based on two specimens collected in Upper Burma (Farrer 1168 and Kingdon-Ward 3412). Fröderström (1930) united this species with *S. Kirilowii* Regel et Tiling, but it is known only within Burma and Yunnan, and somewhat differs from the latter by having larger (7–8 mm long) and purplish- or reddish-brown follicles, oblanceolate leaves with serrate margins, etc. Therefore, I tentatively keep *S. macrocarpum* as a distinct species until further comparative studies will be made.

Specimens examined: Burma. Upper Burma, Chimili, alt. 12000 ft., common in stony places and stone-slides of the high-alpine region (R. Farrer 1168 ♂, E—Syntype of *S. macrocarpum* Praeger); Upper Burma, alt. 12000 ft., 26°10'N, 98°30'E, on sheltered boulder screes surrounded by bamboos, etc., protected east slope, flowers very pale yellow, almost colourless, fruits bright-red (Kingdon-Ward 3412 ♂ and ♀, E—Lectotype of *S. macrocarpum* Praeger). Yunnan. Salwin-Kiukiang Divide, Newahlung, alt. 2900 m, upon rock surface, flowers light green (T.T. Yü 19264 ♂, E); Salwin-Kiukiang Divide, Tsuhwang, alt. 3200 m, open and rocky place, flower pale yellow (Yü 20353 ♂, E); Upper Kiukiang Valley, Chühertonlaka, alt. 4000 m, open and rocky place, flowers pale green (Yü 19804 ♂, E); Upper Kiukiang Valley, South of Lungtsahmuru, alt. 3800 m, under shady rocks, immature fruit scarlet (Yü 19869 ♀, E); inter Taku et Chungtien, alt. 3000–3600 m (Schneider 3127 ♀, E).

Distr. Upper Burma and Yunnan.

6. *Sedum* [*Sedum* § *Japonica*] ***multicaule*** Wall. [Cat. no. 7232 (1832), nom. nud.] ex Lindley, Bot. Regist. Misc. 58 (1840)—Hook. f. et Thoms. in Journ. Linn. Soc. Bot. 2: 102 (1858)—C.B. Clarke in Hook. f., Fl. Brit. Ind. 2: 422 (1879)—R.-Hamet in Bull. Soc. Bot. France 56: 47 (1909) et in Candollea 4: 39 (1929)—Praeger in Journ. Roy. Hort. Soc. 46: 259 (1921)—Berger in Engl. et Prantl, Pflanzenfam. 2 Aufl. 18a: 456 (1930)—Fröd. in Act. Hort. Gothob. 6: append. 83 (1931) et in Ark. Bot. 30A(9): 7 (1943)—Hara, Fl. E. Himal. 107 (1966).

Examined specimen from Burma: Upper Burma, Southern Shan State, Taungyi (Abdul Khalil s.n., CAL).

Distr. Kashmir, Kumaon, Nepal, Sikkim, Bhutan, Tibet, Burma, and Yunnan.

7. *Sedum* [*Rhodiola* § *Rhodiola*] ***nobile*** Franch. in Journ. de Bot. 10: 285 (1896)—Fröd. in Ark. Bot. 30A(9): 2 (1943).

Examined specimens from Burma: N.E. Burma, alt. 11-12000 ft., on humus covered boulders (Forrest 24784 ♂, κ); loc. cit. (Forrest 27320 ♀, κ); 26°30'N, 98°48'E, alt. 13000 ft., in crevices of cliffs and screes and boulders on the western flank of divide (Forrest 26905 ♀, κ).

Distr. N.E. Burma and Yunnan.

8. *Sedum* [*Rhodiola* § *Rhodiola*] ***ovatisepalum*** (R.-Hamet) H. Ohba in Ohashi, Fl. E. Himal. 3rd report, 47 et 339 (1975).

S. linearifolium Royle var. *ovatisepalum* R.-Hamet in Act. Hort. Gothob. 2: 394 (1926)—Fröd. in Act. Hort. Gothob. 5: append. 52 (1930).

S. trifidum Wall. ex Hook. f. et Thoms. in Journ. Linn. Soc. Bot. 2: 100 (1858), nom. superfl., pro minor. parte.

Examined specimens from Burma: Southern Chin Hills, Mt. Victoria, alt. 10000 ft., on rocks, on the south (grass) slope (Kingdon-Ward 22427, GB); loc. cit. summit, flowers pink (Kingdon-Ward 22810, GB); loc. cit. alt. 9,500 ft., on grassy slopes (Alsterlund s.n., GB).

Distr. Nepal, Sikkim, S. Tibet, Bhutan, and W. Burma.

9. *Sedum* [*Rhodiola* § *Rhodiola*] ***venustum*** Praeger in Not. Bot. Gard. Edinb. 13: 97 (1921)—Berger in Engl. et Prantl, Pflanzenfam. 2 Aufl. 18a: 442 (1930).

This species is closely related to both *S. nobile* Franch. and *S. atuntsuense* Praeger. From *S. nobile*, *S. venustum* is distinguishable only in the

shape of leaf, i.e. leaves are linear in the former but oblanceolate or narrowly elliptic in the latter. *S. atuntsuense* differs from *S. venustum* by having rhizomes which are long elongate, cylindrical and densely protected with persistent old arched flowering stems.

Although Praeger did not designate the holotype in the original description of *S. venustum*, he cited the following six specimens: Kingdon-Ward 764, Forrest 14592 & 5054, Cooper 152, Farrer 1189 and Pratt 60. However, his description (incl. illustration) is clearly based on Kingdon-Ward 764 (E) from E. Tibet. Actually he wrote as 'Type' on his determination label of this specimen. Therefore, it is very reasonable to select Kingdon-Ward 764 as the lectotype of *S. venustum* Praeger.

Among these specimens cited above, Farrer 1189 was collected in Upper Burma, Chimili Alps, alt. 12-13000 ft. (E, non vidi).

Distr. E. Tibet, Upper Burma, Yunnan, and W. Szechuan.

10. ***Sedum* [Rhodiola § Rhodiola] *yunnanense*** Franch. in Journ. de Bot. 10: 286 (1896)—Fröd. in Act. Hort. Gothob. 5: append. 47 (1930); in Hand.-Mzt., Symb. Sin. 7: 408 (1931); in Bull. Fan Mem. Inst. Biol. Bot. 7: 12 (1936) et in Act. Hort. Gothob. 15: 12 (1942)—Limprecht in Fedde, Repert. Beiheft. 12: 393 (1922).

S. valerianoides Diels in Engl., Bot. Jahrb. 29: 360 (1901).

S. yunnanense Franch. var. *valerianoides* (Diels) R.-Hamet [in Not. Bot. Gard. Edinb. 5: 117 (1912), nom. nud.] in Candollea 4: 50 (1929)—Praeger in Not. Bot. Gard. Edinb. 13: 100 (1921), nom. non rite publ. et in Journ. Roy. Hort. Soc. 46: 73 (1921), nom. non rite publ.—Limprecht in Fedde, Repert. Beiheft. 12: 393 (1922), nom. non rite publ.—Fröd. in Act. Hort. Gothob. 1: 30 (1924), nom. non rite publ.

S. yunnanense Franch. var. *rotundifolium* Fröd. in Act. Hort. Gothob. 10: append. 160 (1935) et in Ark. Bot. 30A(9): 5 (1943).

Examined specimen from Burma: N.E. Burma, 26°35'N, 98°48'E, alt. 13000 ft., amongst scrub on open stony pasture and/or cliffs (Forrest 27239 ♂ & ♀, K).

Distr. N.E. Burma, Yunnan, and Szechuan.

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ビルマの植物相については Kurz (1877), Collett と Hemsley (1890), Gage (1904), Fischer (1926-40) 等の比較的まとまった報告もあるが、未踏査地も多く、今後の調査・研究に待つところが大きい。ヒマラヤのベンケイソウ属植物の研究と関連して、雲南やビルマの標本等も調べた結果、文献と標本からビルマに 10 種類あることが判った。S. *Kingdonii* (新種) は、Kingdon-Ward (1958) がその植生概要を報告している西部ビルマの Victoria 山で採集したもので、中国西部の *S. Daigremontianum* と *S. Pampaninii* に近縁である。これらの 10 種は分布上次のようなタイプに分けられる。即ち、

a. カシミールからヒマラヤ全域にわたり東はビルマ・雲南に及ぶもの: *Sedum multicaule*.

- b. 東部ヒマラヤに分布の中心があり、東はビルマ・雲南に達するもの： *S. ovatisepalum*, *S. bupleuroides*.
- c. ビルマ・雲南・四川に分布するもの： *S. Kingdonii*, *S. macrocarpum*, *S. nobile*, *S. venustum*, *S. yunnanense*.
- d. ビルマ・雲南から中国中部（甘肅、陝西）に及ぶもの： *S. amplibracteatum*, *S. filipes*.

その結果半数（5種）がビルマ・雲南・四川にかけて分布しているタイプのもので、Kingdon-Ward (1916) がサクラソウ属等で指摘したビルマ・雲南区はひとつのフローラ小区としてまとまりのあることがベンケイソウ属の場合にも肯定できそうに思われる。しかし、Kingdon-Ward (1930) の紀行文からもうかがえるように、周氷河地域やツツジ属を中心とした乾性低木群落の発達した山岳地帯、特に雲南との国境地帯の調査が一層進めば、既に雲南から報告された種類等が新たに発見される可能性は高く、今後多くの資料の収集をまってさらに植物地理学的な検討を進めてみたい。

○ソテツの変異株（佐竹利彦） Toshihiko SATAKE: Variants of *Cycas revoluta* Thunb. (Plate V)

ソテツ *Cycas revoluta* Thunb. は一見したところでは個体変異が少ないように見えるが、10年以上栽培しても特徴が変わらない変異株がある。本邦産のソテツの変異株としてはシシ（シシソテツ、シンガシラソテツ）、f. *nana*, f. *polycephala* マツバソテツ、および斑入り葉をもつものが知られている（佐竹 1970、最新園芸大辞典 2: 562-564）。筆者はこれら既報の変異株のほかに、無毛の株、長い苞葉刺を持つ株、および葉が萎縮してヒトデ状をなす株を採取した。以下、この3変異株の形態を略記し、併せてソテツの変異に関する若干の知見を記述する。

1. *glabra* (図版 1A)。1972年に沖永良部島から採集した1株で、アオエソテツと呼んでいる。普通型が葉の裏面、葉柄、葉柄基、苞葉刺および苞葉基等に淡褐色の綿毛を密生するのにくらべて、この変異株はこれらの部位がすべて無毛である。このためこれらの部位が滑らかで、それぞれ色が鮮明で光沢を帶びている。茎の直径は約 15 cm、茎の長さは約 1 m、植物体各部成分の形と成長は正常であるが、まだ花は形成されない。

2. *hystrix* (図版 1B)。1973年に奄美大島および沖永良部島からそれぞれ1株ずつ採集されたもので、ハリソテツと呼んでいる。苞葉刺が長く約 10~20 cm である。普通型の苞葉刺は約 6~12 cm であるから、約 1.5 倍もある。そのうえ、普通型の苞葉刺は早く腐蝕して消滅するが、この変異株の苞葉刺は長期に亘り固着して残る。普通型の枝変りとして得られた葉は普通型よりやや軟弱である。花はまだ生じない。

3. *involuta* (図版 1C)。1973年に奄美大島および沖永良部島からそれぞれ1株ず